

abstract

Radiolysis of Amino Acids in Outer Solar-System Ice Analogs

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Amino acids have been found in cometary dust particles and in the organic component of meteorites. These molecules, important for pre-biotic chemistry and for active biological systems, might be formed in cold planetary or interstellar environments and then delivered to H₂O-rich surfaces in the outer Solar System. Many models for the availability of organic species on Earth and elsewhere depend on the ability of these molecules to survive in radiation-rich space environments. This poster presents results of 0.8-MeV proton radiolysis of ice films at 15-140K. Using infrared spectroscopy, the destruction rates of glycine, alanine, and phenylalanine have been determined for both pure films and those containing amino acids diluted in H₂O. Our results are discussed in terms of the survivability of these molecules in the icy surfaces present in the outer Solar System and the possibility of their detection by instruments on board the New Horizons spacecraft.